



DIVERSIFYING FOREST MANAGEMENT METHODS

2. Regeneration Results

The management of boreal forests is largely based on even-aged forestry. In the Lapland region, continuous cover forestry has in recent years accounted for roughly seven percent of the total harvested area.

From the perspective of selecting the management strategy for different kinds of forests, regeneration success is critically important. Continuous cover forestry is based on natural forest regeneration, and in harvesting operations it is important to consider that the forest's regenerative capacity is secured.

The demonstration forests in the Rovaniemi area function as forest laboratories (Living Labs) that serve the different needs of forest owners and managers. The main purpose is to illustrate how forest management can be diversified. Visitors are free to observe what different types of harvesting look like in practice and what kinds of effects different harvesting methods have on forest regeneration, growth, and biodiversity. The sites are also used to monitoring and research.



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Regeneration Results Four Years After Harvesting Operations

At seven demonstration forest sites, different methods of continuous cover forestry and even aged forestry are being studied. The sites illustrate and compare clearcutting, seed tree cutting, small gap cutting, and selection cutting. In addition, each site includes an untreated control area.

In this brochure, the number of Scots pine seedlings on the sample plots before forest management (2020) and the results four years after the treatments (2025) are presented.

After the forest management treatments, all sample plots and the control area had on average at least 1,000 Scots pine seedlings/ha that were taller than 10 cm. Median values were lower, with the lowest values observed in selection cutting and small gap cutting – only 200 seedlings per hectare (Table 1).

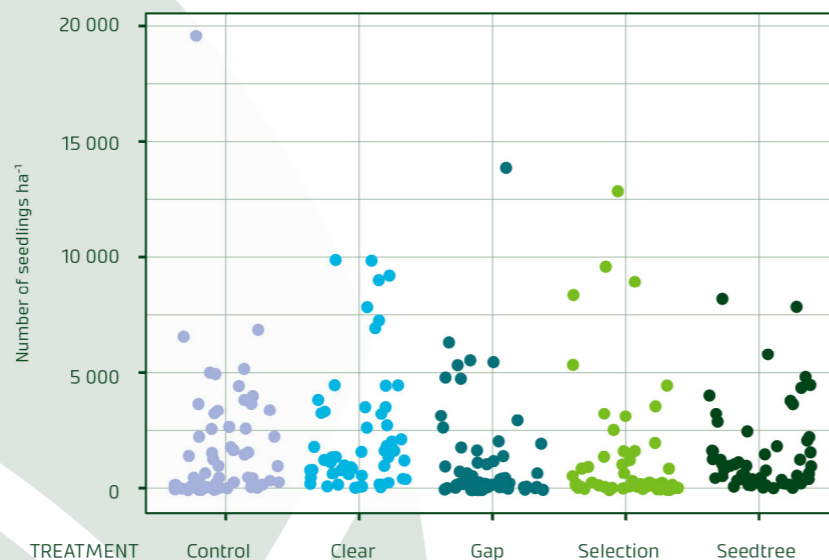


MAP: Location of the demonstration forest sites in the Rovaniemi area

STATISTIC	CONTROL	CLEAR	GAP	SELECTION	SEEDTREE
Average	1908 (1682)	2382 (1846)	1346 (1346)	1396 (1704)	1578 (1538)
Median	800 (800)	1400 (800)	200 (400)	200 (400)	1000 (400)

TABLE 1. Number of Scots pine seedlings per hectare four years after harvesting (2025). Numbers in parentheses refer to number of seedlings before harvesting.

FIGURE 1. Number of Scots pine seedlings four years after harvesting 2025.



Effects of Forest Management Treatments

Four years after harvesting (2025), the highest number of Scots pine seedlings was found in clearcutting and seed tree cutting areas (Figure 2). The good seedling numbers in clearcutting areas are explained by soil preparation combined with seed sowing. In seed tree cutting, the soil surface is basically scarified except in one barren area.

Due to shading and competition from the remaining trees, regeneration in small gap cutting and selection cutting is at the same level as in the unharvested control stands. In small gap and selection cutting areas, some of the existing seedlings have died, as seedling density has dropped below 1,000 seedlings per hectare.

Average height of Scots pine seedlings:

- All seedlings: 25 cm (all sample plots)
- Seedlings established after the treatments: 16 cm (all sample plots)
- In clearcutting areas: all seedlings 32 cm, and post harvest seedlings 16 cm

Effects of Standing Trees on Seedling Growth

The amount of standing tree biomass significantly reduces seedling growth. This is due to shading and to root level competition for soil nutrients and water (Figure 3).



NOTES FOR INTERPRETATION OF THE RESULTS

The measurements do not include Scots pine seedlings shorter than 10 cm. In addition, pine seed sowing was carried out in connection with soil preparation on the clearcut area. Statistical modelling has been used in the comparisons of the forest management methods.

FIGURE 2. Scots pine seedling numbers per hectare by treatment: the dot in the middle of each line indicates the predicted number of seedlings, and the lines show the 95% confidence interval.

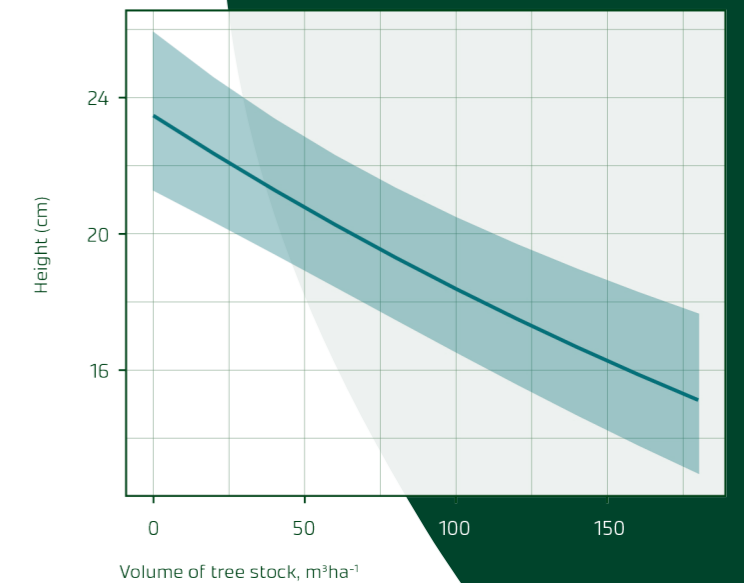
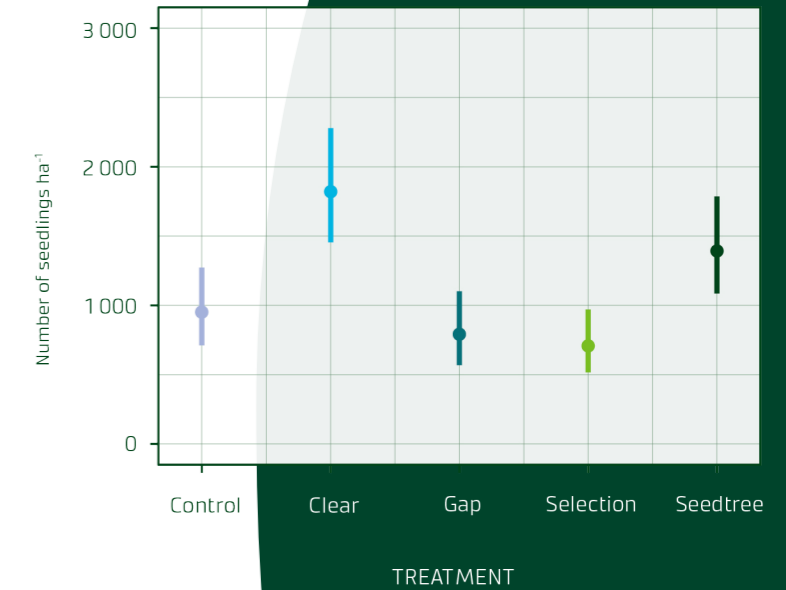


FIGURE 3. Effect of surrounding stand density on seedling height four years after harvesting. The curve shows the predicted seedling height, and the grey area represents the 95% confidence interval. The prediction is calculated assuming a seedling age of 11 years (the average).



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TRANSFORMIT - Integrating societal demands with biodiversity

transformforest.eu

 TRANSFORMIT Project

 European Forest Institute

Transformit tests Integrative Forest Management (IFM) in seven living labs across Europe, aiming to balance economic sustainability with social sustainability and biodiversity.

- Transformit project is a European research and development initiative aiming to **promote sustainable forest management** that balances environmental, economic, and social outcomes across various forest types and contexts.
- In practice, this means Integrative Forest Management.
- The project **tests new forest management solutions** in forest living labs across Europe, including one in Lapland, Finland.
- It also seeks to build **collaboration between researchers and practitioners**.
- The project involves **16 organizations from 12 countries**, including the Natural Resources Institute Finland (Luke). It is coordinated by the European Forest Institute (EFI).
- Funded by the European Union, the project has a budget of €6.9 million under the **Horizon Europe Research and Innovation program** (grant agreement 101135263).

1. **FINLAND:** Lapland
2. **CZECH REPUBLIC:** Central Bohemia
3. **AUSTRIA:** Styria
4. **CROATIA:** Zagreb
5. **SWITZERLAND:** Basel Canton
6. **FRANCE:** Les Landes
7. **SPAIN:** Catalonia



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